

WE CLAIM:

1. A process for preparing a layer of a nano-porous metal oxide semiconductor comprising the steps of: (i) providing metal oxide semiconductor nano-particles prepared by a wet precipitation process, (ii) heating said nano-particles at a temperature in the range of 250 to 600°C, (iii) preparing a dispersion of said heat-treated nano-particles from step (ii), (iv) applying said dispersion prepared in step (iii) to a support to produce a coating; and (v) subjecting said coating to a pressure in the range of 100 to 1000 bar at a temperature below 250°C.
2. Process according to claim 1, wherein said metal oxide is selected from the group consisting of titanium oxides, tin oxides, niobium oxides, tantalum oxides, tungsten oxides and zinc oxides.
3. Process according to claim 1, wherein said pretreatment temperature is in the range of 300 to 500°C.
4. Process according to claim 1, wherein said sintering pressure is in the range 400 to 600 bar.
5. Process according to claim 1, wherein the process further comprises heating said coating subjected to pressure from step (v) at a temperature of 100 to 200°C.
6. Process according to claim 1, wherein said nano-porous metal oxide semiconductor has a band-gap of greater than 2.9 eV.
7. Process according to claim 1, wherein said nano-porous metal oxide nano-particles have a mean number averaged particle size \leq 20 nm.
8. A layer of a nano-porous metal oxide semiconductor obtained by a process for preparing a layer of a nano-porous metal oxide semiconductor comprising the steps of: (i) providing metal oxide semiconductor nano-particles prepared by a wet precipitation process, (ii) heating said nano-particles at a temperature in the range of 250 to 600°C, (iii) preparing a dispersion of said heat-treated nano-particles from step (ii), (iv) applying said dispersion prepared in step (iii) to a support to produce a

coating; and (v) subjecting said coating to a pressure in the range of 100 to 1000 bar at a temperature between 20 and 250°C.

9. Layer according to claim 8, wherein said layer contains at least
5 one spectral sensitizer for the nano-porous metal oxide semiconductor selected from the group consisting of metal chalcogenide nano-particles with a band-gap between 1.5 and 2.9 eV, organic dyes, and metallo-organic dyes.
- 10 10. A photovoltaic device comprising a layer of a nano-porous metal oxide semiconductor obtained by a process for preparing a layer of a nano-porous metal oxide semiconductor comprising the steps of: (i) providing metal oxide semiconductor nano-particles prepared by a wet precipitation process, (ii) heating said nano-
15 particles at a temperature in the range of 250 to 600°C, (iii) preparing a dispersion of said heat-treated nano-particles from step (ii), (iv) applying said dispersion prepared in step (iii) to a support to produce a coating; and (v) subjecting said
20 coating to a pressure in the range of 100 to 1000 bar at a temperature below 250°C.